PATENT ABSTRACTS OF JAPAN

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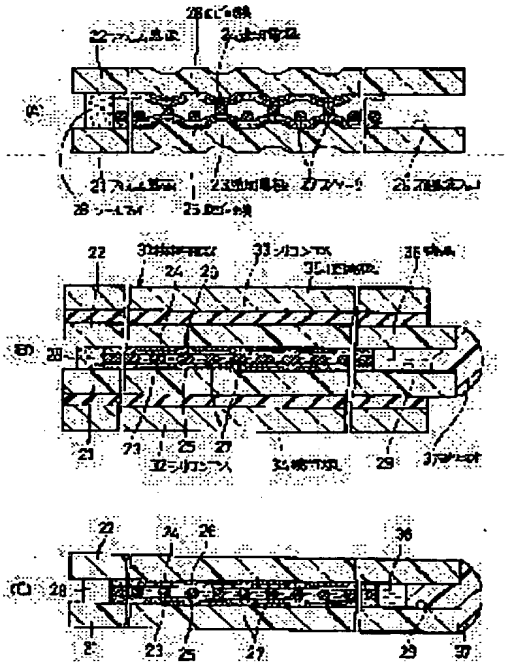
(54) PRODUCTION OF LIQUID CRYSTAL DISPLAY DEVICE

(57)Abstract:
PURPOSE: To uniformalize the spacing between both film substrates and to prevent the leakage of a liquid crystal from a liquid crystal injection port.
CONSTITUTION: Two sheets of the film substrates 21, 22 are stuck to each other via a sealing material 28 by interposing spacers 27 consisting of resin particles therebetween. The film substrates 21, 22 are partly deflected to a projecting shape by a certain cause in this state. All the spacers 27 are nearly uniformly crushed when the two film substrates 21, 22 are clamped by a clamping member 31 and a pressure is applied thereto. The spacing between these film substrates 21 and 22 is thereby made slightly smaller than a desired spacing. The liquid crystal 36 is then injected and a sealing material 37 is disposed in the liquid crystal injection port 29. All the spacers 27 are elastically reset when the clamping by the clamping member 31 is released. The spacing between the film substrates 21 and 22 is thereby made into the desired spacing. A negative pressure is generated in the liquid crystal injection part and the sealing material 37 is sucked into the liquid crystal injection port 29.



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CLAIMS

[Claim(s)]

[Claim 1] A sealant is minded in the state where the spacer was made for two film substrates by which the transparent electrode was prepared in the field which carries out phase opposite, respectively to intervene between them. Lamination, Subsequently, where it applied the pressure from front reverse side both-sides side of both the aforementioned film substrate and the interval between both the aforementioned film substrates is made smaller than an expected interval a little Liquid crystal is poured in through the liquid crystal inlet formed between both the aforementioned film substrates in the inside of the aforementioned sealant at the aforementioned sealant. Subsequently, while arranging a sealing agent in the aforementioned liquid crystal inlet, canceling the aforementioned pressure subsequently and returning the interval between both the aforementioned film substrates to an expected interval The manufacture method of the liquid crystal display characterized by for between both the aforementioned film substrates in the inside of the aforementioned sealant making the aforementioned sealing agent draw inside the aforementioned liquid crystal inlet by negative pressure and the bird clapper, stiffening the account sealing agent of back to front, and closing the aforementioned liquid crystal inlet.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the manufacture method of a liquid crystal display.

[0002]

[Description of the Prior Art] The thing of the structure which enclosed liquid crystal between the orientation films of lamination and both the film substrate in the inside of a sealant through the sealant in the state where the spacer was made for two film substrates by which the transparent electrode and the orientation film were prepared in the field which carries out phase opposite, respectively to intervene between them is shown in the conventional liquid crystal display. In this case, it is for keeping the interval between both film substrates constant with a sufficient precision, and making the display property of liquid crystal uniform to make a spacer intervene.

[0003] by the way, in manufacturing such a liquid crystal display As an example, two film substrates are prepared first. A transparent-electrode formation process, After passing through an orientation film formation process and a sealant

formation process, a spacer is sprinkled in the shape of spraying by the spray on the front face of an orientation film prepared on one film substrate. Subsequently, on the other hand, by sticking the film substrate of another side through a sealant on a film substrate, arranging both the film substrate subsequently to in a vacuum tub, and making the inside of a vacuum tub into a vacuum the liquid crystal which made the vacuum between the orientation films of both the film substrate in the inside of a sealant through the liquid crystal inlet formed in the sealant, and was prepared subsequently to in a vacuum tub -- by soaking the portion of a liquid crystal inlet useless and subsequently making the inside of a vacuum tub into atmospheric pressure The liquid crystal in liquid crystal useless is poured in between the orientation films of both the film substrate in the inside of a sealant through a liquid crystal inlet, subsequently to a liquid crystal inlet a sealing agent is arranged, subsequently this sealing agent is stiffened, and the liquid crystal inlet is closed.

[0004]

[Problem(s) to be Solved by the Invention] However, by the manufacture method of such a conventional liquid crystal display, there were the following problems from the relation by which a film substrate tends to be bent. Namely, stress is added by carrying out the coat of the transparent electrodes 3 and 4 to the portion in which the transparent electrodes 3 and 4 of the film substrates 1 and 2 were formed, as shown, for example in drawing 3 . Although the interval between the orientation film 5 in the portion by which this portion bent in convex and was bent in convex [this] as a result, and 6 turns into an expected interval with the spacer 7 which intervened between them It became larger than an expected interval, and, for this reason, the difference arose at the interval between both the film substrate 1 and 2 by the place, as a result the interval between the orientation film 5 in portions other than the portion which bent in convex, and 6 had the problem that display quality was spoiled. moreover -- since the adhesion of the film substrates 1 and 2 and a sealing agent 11 generally is not so good -- the inside of the liquid crystal inlet 10 of a sealing agent 11, although it enters and it is necessary to make [many / to some extent] an amount Since the liquid crystal inlet 10 is only merely closed with the sealing agent 11 after pouring in liquid crystal 9 between the orientation film 5 of both the film substrates 1 and 2 in the inside of a sealant 8, and 6 It entered and there was a problem that there were few amounts and there was a thing into the liquid crystal inlet 10 of a sealing agent 11 which liquid crystal 9 leaks from the liquid crystal inlet 10 as a result. The

purpose of this invention is to offer the manufacture method of a liquid crystal display that the interval between both film substrates can be made uniform, and liquid crystal can enable it not to leak from a liquid crystal inlet easily.

[0005]

[Means for Solving the Problem] This invention minds a sealant in the state where the spacer was made for two film substrates by which the transparent electrode was prepared in the field which carries out phase opposite, respectively to intervene between them. Lamination, Subsequently, where it applied the pressure from front reverse side both-sides side of both the aforementioned film substrate and the interval between both the aforementioned film substrates is made smaller than an expected interval a little Liquid crystal is poured in through the liquid crystal inlet formed between both the aforementioned film substrates in the inside of the aforementioned sealant at the aforementioned sealant. Subsequently, while arranging a sealing agent in the aforementioned liquid crystal inlet, canceling the aforementioned pressure subsequently and returning the interval between both the aforementioned film substrates to an expected interval Between both the aforementioned film substrates in the inside of the aforementioned sealant makes the aforementioned sealing agent draw inside the aforementioned liquid crystal inlet by negative pressure and the bird clapper, stiffens the account sealing agent of back to front, and closes the aforementioned liquid crystal inlet.

[0006]

[Function] Even if the portion in which the transparent electrode of a film substrate was formed has bent in convex at the beginning according to this invention By applying a pressure and making the interval between both film substrates smaller than an expected interval a little.Since can lose convex bending, and pour in liquid crystal through a liquid crystal inlet in this state, a sealing agent is arranged subsequently to a liquid crystal inlet, a pressure is subsequently canceled and the interval between both film substrates is returned to the expected interval, the interval between both film substrates can be made uniform. moreover -- since between both the film substrates in the inside of a sealant serves as negative pressure and it is made to draw a sealing agent inside a liquid crystal inlet by this by canceling a pressure and returning the interval between both film substrates to an expected interval -- the inside of the liquid crystal inlet of a sealing agent -- since enter, an amount becomes large, a sealing agent is stiffened after that and the liquid crystal inlet is closed, liquid crystal can make it possible not to leak from a liquid crystal inlet easily

[0007]

[Example] Drawing 1 (A) - (C) shows each manufacturing process of the liquid crystal display in one example of this invention, respectively. Then, the manufacture method of the liquid crystal display of this example is explained, referring to these drawings in order. First, as shown in drawing 1 (A), it sticks through a sealant 28 in the state where the spacer 27 which consists of a resin particle with a spherical fixed size between them two film substrates 21 and 22 by which transparent electrodes 23 and 24 and the orientation films 25 and 26 were formed in the field which carries out phase opposite, respectively was made to intervene. Stress is added by carrying out the coat of the transparent electrodes 23 and 24 to the portion in which the transparent electrodes 23 and 24 of the film substrates 21 and 22 were formed in this state. Although the interval between the orientation film 25 in the portion by which this portion bent in convex and was bent in convex [this] as a result, and 26 is an expected interval with the spacer 27 which intervened between them The interval between the orientation film 25 in portions other than the portion which bent in convex, and 26 is larger than an expected interval. In addition, in drawing 1 (A), a sign 29 shows the liquid crystal inlet formed of the sealant 28.

[0008] next, it is shown in drawing 1 (B) -- as -- pinching -- a member 31 is prepared pinching -- a member 31 is equipped with two pinching boards 34 and 35 which consist of glass metallurgy groups by which silicone rubber 32 and 33 was formed in the field which carries out phase opposite, respectively, is connected free [rotation] by the hinge which one edge each of two pinching boards 34 and 35 does not illustrate, and is fixed by the fastening plate which each of that other end similarly does not illustrate Silicone rubber 32 and 33 is for not damaging the film substrates 21 and 22. and pinching -- if both the film substrates 21 and 22 are pinched from the front reverse side both-sides side and a predetermined pressure is equally applied by the member 31 from front reverse side both-sides side of both the film substrates 21 and 22, when the spacer 27 which consists of a spherical resin particle is crushed almost equally altogether, the interval between both the film substrate 21 and 22 will become small a little rather than an expected interval Consequently, even if the portion in which the transparent electrodes 23 and 24 of the film substrates 21 and 22 were formed has bent in convex at the beginning, this convex bending can be lost.

[0009] next, pinching -- let between the orientation film 25 of both the film substrates 21 and 22 in the inside of a sealant 28, and 26 be a vacuum through

the liquid crystal inlet 29 by arranging in the vacuum tub which does not illustrate both the film substrates 21 and 22 pinched by the member 31, and making the inside of a vacuum tub into a vacuum next, the liquid crystal prepared in the vacuum tub -- the liquid crystal 36 in liquid crystal useless is poured in through the liquid crystal inlet 29 between the orientation film 25 of both the film substrates 21 and 22 in the inside of a sealant 28, and 26 by soaking the portion of the liquid crystal inlet 29 useless, and subsequently making the inside of a vacuum tub into atmospheric pressure next, pinching -- both the film substrates 21 and 22 pinched by the member 31 are taken out from the inside of a vacuum tub, and the sealing agent 36 which consists of a photoresist subsequently to the liquid crystal inlet 29 is arranged since the sealing agent 36 is only merely arranged in the liquid crystal inlet 29 in this state -: the inside of the liquid crystal inlet 29 of a sealing agent 37 -- it enters and there are few amounts [0010] next, pinching -- a member 31 is removed and the pressure to both the film substrates 21 and 22 is canceled Then, as shown in drawing 1 (C), when the spacer 27 which consists of a resin particle carries out an elastic return altogether, the interval between both the film substrate 21 and 22 turns into an expected interval. Therefore, the interval between both the film substrate 21 and 22 can be made uniform. moreover, if a pressure is canceled and the interval between both the film substrate 21 and 22 is returned to an expected interval, between the orientation film 25 of both the film substrates 21 and 22 in the inside of a sealant 28 and 26 will serve as negative pressure, and the sealing agent 37 which is in the state where it does not harden for this reason will draw inside the liquid crystal inlet 29 -- having -- the inside of the liquid crystal inlet 29 of a sealing agent 37 -- it enters and an amount becomes large Then, ultraviolet rays are irradiated, a sealing agent 37 is stiffened, and the liquid crystal inlet 29 is closed. in this case -- even if the adhesion of the film substrates 21 and 22 and a sealing agent 37 is not so good -- the inside of the liquid crystal inlet 29 of a sealing agent 37 -- since it enters and the amount is large, liquid crystal 36 can make it possible not to leak from the liquid crystal inlet 29 easily In this way, the liquid crystal display of this example is manufactured.

[0011] In addition, although the above-mentioned example explained the case where what consists of a resin particle spherical as a spacer 27 was used, you may use what consists of spherical particles, such as not only this but a glass metallurgy group. in this case, it is shown in drawing 2 (A) -- as -- pinching, if both the film substrates 21 and 22 are pinched from the front reverse side both-sides

side and a pressure is applied by the member 31 from front reverse side both-sides side of both the film substrates 21 and 22 When the spacer 27 which consists of spherical particles, such as a glass metallurgy group, eats into the up-and-down orientation films 25 and 26 almost equally altogether, the interval between both the film substrate 21 and 22 can be made smaller than an expected interval a little. and pinching -- if a member 31 is removed and the pressure to both the film substrates 21 and 22 is canceled, as shown in drawing 2 (B), when both the up-and-down orientation films 25 and 26 carry out an elastic return, let the interval between both the film substrate 21 and 22 be an expected interval

[0012]

[Effect of the Invention] As explained above, even if the portion in which the transparent electrode of a film substrate was formed has bent in convex at the beginning according to this invention By applying a pressure and making the interval between both film substrates smaller than an expected interval a little Since can lose convex bending, and pour in liquid crystal through a liquid crystal inlet in this state, a sealing agent is arranged subsequently to a liquid crystal inlet, a pressure is subsequently canceled and the interval between both film substrates is returned to the expected interval, the interval between both film substrates can be made uniform. moreover -- since between both the film substrates in the inside of a sealant serves as negative pressure and it is made to draw a sealing agent inside a liquid crystal inlet by this by canceling a pressure and returning the interval between both film substrates to an expected interval -- the inside of the liquid crystal inlet of a sealing agent -- since enter, an amount becomes large, a sealing agent is stiffened after that and the liquid crystal inlet is closed, liquid crystal can make it possible not to leak from a liquid crystal inlet easily

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] For the cross section in the state where two film substrates were stuck through the sealant, and (B), on the occasion of manufacture of the liquid crystal display in one example of this invention, (C) is [(A)] a cross section in the state where the pressure was applied from front reverse side both-sides side of both the film substrate by the pinching member, and a cross section in the state where it completed.

[Drawing 2] For (A), on the occasion of manufacture of the liquid crystal display in other examples of this invention, (B) is a cross section in the state where the pressure was applied from front reverse side both-sides side of both the film

substrate by the pinching member, and a cross section in the state where it completed.

[Drawing 3] The cross section shown in order to explain the trouble of the conventional liquid crystal display.

[Description of Notations]

21 22 Film substrate

23 24 Transparent electrode

25 26 Orientation film

27 Spacer

28 Sealant

29 Liquid Crystal Inlet

31 Pinching -- Member

36 Liquid Crystal

37 Sealing Agent

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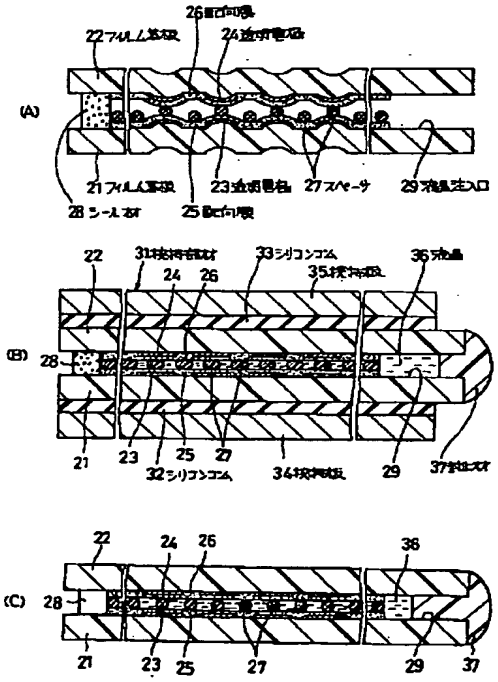
(54)【発明の名称】　液晶表示装置の製造方法

(57)【要約】

【目的】　両フィルム基板間の間隔を均一とし、また液晶注入口から液晶が漏れにくいようにする。

【構成】　２枚のフィルム基板２１、２２をその間に樹脂粒子からなるスペーサ２７を介在させた状態でシール材２８を介して貼り合わせる。この状態では、フィルム基板２１、２２の一部がある理由により凸状に撓んでいる。次に、挟持部材３１によって両フィルム基板２１、２２を挟持して圧力を加えると、スペーサ２７がすべてほぼ均等につぶれることにより、両フィルム基板２１、２２間の間隔が所期の間隔よりも若干小さくなる。次に、液晶３６を注入し、次いで液晶注入口２９に封止材３７を配設する。この後、挟持部材３１による挟持を解除すると、スペーサ２７がすべて弾性復帰することにより、両フィルム基板２１、２２間の間隔が所期の間隔となる。また、液晶注入部が負圧となり、封止材３７が液晶注入口２９の内側に引き込まれる。



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【特許請求の範囲】

【請求項１】　相対向する面にそれぞれ透明電極が設けられた２枚のフィルム基板をその間にスペーサを介在させた状態でシール材を介して貼り合わせ、次いで前記両フィルム基板の表裏両面側から圧力を加えて前記両フィルム基板間の間隔を所期の間隔よりも若干小さくした状態で、前記シール材の内側における前記両フィルム基板間に前記シール材に形成された液晶注入口を介して液晶を注入し、次いで前記液晶注入口に封止材を配設し、次いで前記圧力を解除して前記両フィルム基板間の間隔を所期の間隔に復帰させるとともに、前記シール材の内側における前記両フィルム基板間が負圧となることにより前記封止材を前記液晶注入口の内側に引き込ませ、その後前記封止材を硬化させて前記液晶注入口を封止するようにしたことを特徴とする液晶表示装置の製造方法。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】この発明は液晶表示装置の製造方法に関する。

【０００２】

【従来の技術】従来の液晶表示装置には、相対向する面にそれぞれ透明電極および配向膜が設けられた２枚のフィルム基板をその間にスペーサを介在させた状態でシール材を介して貼り合わせ、シール材の内側における両フィルム基板の配向膜間に液晶を封入した構造のものがある。この場合、スペーサを介在させるのは、両フィルム基板間の間隔を精度良く一定に保ち、液晶の表示特性を均一とするためである。

【０００３】ところで、このような液晶表示装置を製造する場合には、一例として、まず２枚のフィルム基板を用意し、透明電極形成工程、配向膜形成工程およびシール材形成工程を経た後、一方のフィルム基板上に設けられた配向膜の表面にスペーサをスプレーで噴霧状に散布し、次いで一方のフィルム基板上に他方のフィルム基板をシール材を介して貼り付け、次いで両フィルム基板を真空槽内に配置し、真空槽内を真空とすることにより、シール材に形成された液晶注入口を介してシール材の内側における両フィルム基板の配向膜間を真空とし、次いで真空槽内に設けられた液晶だめに液晶注入口の部分を漬け、次いで真空槽内を大気圧とすることにより、液晶だめ内の液晶を液晶注入口を介してシール材の内側における両フィルム基板の配向膜間に注入し、次いで液晶注入口に封止材を配設し、次いでこの封止材を硬化させて液晶注入口を封止している。

【０００４】

【発明が解決しようとする課題】しかしながら、従来のこのような液晶表示装置の製造方法では、フィルム基板が撓みやすい関係から、次のような問題があった。すなわち、例えば図３に示すように、フィルム基板１、２の透明電極３、４が形成された部分に透明電極３、４が被

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膜されていることによりストレスが加わり、この結果この部分が凸状に撓み、この凸状に撓んだ部分における配向膜５、６間の間隔はその間に介在されたスペーサ７によって所期の間隔となるが、凸状に撓んだ部分以外の部分における配向膜５、６間の間隔は所期の間隔よりも大きくなり、このため場所によって両フィルム基板１、２間の間隔に差が生じ、ひいては表示品質が損なわれるという問題があった。また、一般にフィルム基板１、２と封止材１１との密着性があまり良くないので、封止材１１の液晶注入口１０内への入り込み量をある程度多くする必要があるが、シール材８の内側における両フィルム基板１、２の配向膜５、６間に液晶９を注入した後に液晶注入口１０を封止材１１でただ単に封止しているだけであるので、封止材１１の液晶注入口１０内への入り込み量が少なく、この結果液晶注入口１０から液晶９が漏れることがあるという問題があった。この発明の目的は、両フィルム基板間の間隔を均一とすることができ、また液晶注入口から液晶が漏れにくいようにすることのできる液晶表示装置の製造方法を提供することにある。

【０００５】

【課題を解決するための手段】この発明は、相対向する面にそれぞれ透明電極が設けられた２枚のフィルム基板をその間にスペーサを介在させた状態でシール材を介して貼り合わせ、次いで前記両フィルム基板の表裏両面側から圧力を加えて前記両フィルム基板間の間隔を所期の間隔よりも若干小さくした状態で、前記シール材の内側における前記両フィルム基板間に前記シール材に形成された液晶注入口を介して液晶を注入し、次いで前記液晶注入口に封止材を配設し、次いで前記圧力を解除して前記両フィルム基板間の間隔を所期の間隔に復帰させるとともに、前記シール材の内側における前記両フィルム基板間が負圧となることにより前記封止材を前記液晶注入口の内側に引き込ませ、その後前記封止材を硬化させて前記液晶注入口を封止するようにしたものである。

【０００６】

【作用】この発明によれば、フィルム基板の透明電極が形成された部分が当初凸状に撓んでいても、圧力を加えて両フィルム基板間の間隔を所期の間隔よりも若干小さくすることにより、凸状の撓みをなくすことができ、そしてこの状態で液晶注入口を介して液晶を注入し、次いで液晶注入口に封止材を配設し、次いで圧力を解除して両フィルム基板間の間隔を所期の間隔に復帰させているので、両フィルム基板間の間隔を均一とすることができる。また、圧力を解除して両フィルム基板間の間隔を所期の間隔に復帰させることにより、シール材の内側における両フィルム基板間が負圧となり、これにより封止材を液晶注入口の内側に引き込むようにしているので、封止材の液晶注入口内への入り込み量が大きくなり、その後封止材を硬化させて液晶注入口を封止しているので、液晶注入口から液晶が漏れにくいようにすることができ

る。

【０００７】

【実施例】図１（Ａ）～（Ｃ）はそれぞれこの発明の一実施例における液晶表示装置の各製造工程を示したものである。そこで、これらの図を順に参照しながら、この実施例の液晶表示装置の製造方法について説明する。まず、図１（Ａ）に示すように、相対向する面にそれぞれ透明電極２３、２４および配向膜２５、２６が設けられた２枚のフィルム基板２１、２２をその間に一定寸法の球状の樹脂粒子からなるスペーサ２７を介在させた状態でシール材２８を介して貼り合わせる。この状態では、フィルム基板２１、２２の透明電極２３、２４が形成された部分に透明電極２３、２４が被膜されていることによりストレスが加わり、この結果この部分が凸状に撓み、この凸状に撓んだ部分における配向膜２５、２６間の間隔はその間に介在されたスペーサ２７によって所期の間隔となっているが、凸状に撓んだ部分以外の部分における配向膜２５、２６間の間隔は所期の間隔よりも大きくなっている。なお、図１（Ａ）において符号２９はシール材２８によって形成された液晶注入口を示す。

【０００８】次に、図１（Ｂ）に示すように、挟持部材３１を用意する。挟持部材３１は、相対向する面にそれぞれシリコンゴム３２、３３が設けられたガラスや金属等からなる２枚の挟持板３４、３５を備え、２枚の挟持板３４、３５の各一端部が図示しないヒンジによって回動自在に連結され、その各他端部が同じく図示しない止め金具によって固定されるようになっている。シリコンゴム３２、３３はフィルム基板２１、２２を傷付けないようにするためのものである。そして、挟持部材３１によって両フィルム基板２１、２２をその表裏両面側から挟持し、両フィルム基板２１、２２の表裏両面側から所定の圧力を均等に加えると、球状の樹脂粒子からなるスペーサ２７がすべてほぼ均等につぶれることにより、両フィルム基板２１、２２間の間隔が所期の間隔よりも若干小さくなる。この結果、フィルム基板２１、２２の透明電極２３、２４が形成された部分が当初凸状に撓んでいても、この凸状の撓みをなくすことができる。

【０００９】次に、挟持部材３１で挟持した両フィルム基板２１、２２を図示しない真空槽内に配置し、真空槽内を真空とすることにより、液晶注入口２９を介してシール材２８の内側における両フィルム基板２１、２２の配向膜２５、２６間を真空とする。次に、真空槽内に設けられた液晶だめに液晶注入口２９の部分を漬け、次いで真空槽内を大気圧とすることにより、液晶だめ内の液晶３６を液晶注入口２９を介してシール材２８の内側における両フィルム基板２１、２２の配向膜２５、２６間に注入する。次に、挟持部材３１で挟持した両フィルム基板２１、２２を真空槽内から取り出し、次いで液晶注入口２９に光硬化性樹脂からなる封止材３６を配設する。この状態では、液晶注入口２９に封止材３６をただ単に配設しているだけであるので、封止材３７の液晶注入口２９内への入り込み量は少ない。

【００１０】次に、挟持部材３１を取り外し、両フィルム基板２１、２２に対する圧力を解除する。すると、図１（Ｃ）に示すように、樹脂粒子からなるスペーサ２７がすべて弾性復帰することにより、両フィルム基板２１、２２間の間隔が所期の間隔となる。したがって、両フィルム基板２１、２２間の間隔を均一とすることができる。また、圧力を解除して両フィルム基板２１、２２間の間隔を所期の間隔に復帰させると、シール材２８の内側における両フィルム基板２１、２２の配向膜２５、２６間が負圧となり、このため未硬化状態にある封止材３７が液晶注入口２９の内側に引き込まれ、封止材３７の液晶注入口２９内への入り込み量が大きくなる。この後、紫外線を照射して封止材３７を硬化させて液晶注入口２９を封止する。この場合、フィルム基板２１、２２と封止材３７との密着性があまり良くなくても、封止材３７の液晶注入口２９内への入り込み量が大きくなっているので、液晶注入口２９から液晶３６が漏れにくいようにすることができる。かくして、この実施例の液晶表示装置が製造される。

【００１１】なお、上記実施例では、スペーサ２７として球状の樹脂粒子からなるものを用いた場合について説明したが、これに限らず、ガラスや金属等の球状の粒子からなるものを用いてもよい。この場合、図２（Ａ）に示すように、挟持部材３１によって両フィルム基板２１、２２をその表裏両面側から挟持し、両フィルム基板２１、２２の表裏両面側から圧力を加えると、ガラスや金属等の球状の粒子からなるスペーサ２７がすべて上下の配向膜２５、２６にほぼ均等に食い込むことにより、両フィルム基板２１、２２間の間隔を所期の間隔よりも若干小さくすることができる。そして、挟持部材３１を取り外し、両フィルム基板２１、２２に対する圧力を解除すると、図２（Ｂ）に示すように、上下の配向膜２５、２６が共に弾性復帰することにより、両フィルム基板２１、２２間の間隔を所期の間隔とすることができる。

【００１２】

【発明の効果】以上説明したように、この発明によれば、フィルム基板の透明電極が形成された部分が当初凸状に撓んでいても、圧力を加えて両フィルム基板間の間隔を所期の間隔よりも若干小さくすることにより、凸状の撓みをなくすことができ、そしてこの状態で液晶注入口を介して液晶を注入し、次いで液晶注入口に封止材を配設し、次いで圧力を解除して両フィルム基板間の間隔を所期の間隔に復帰させているので、両フィルム基板間の間隔を均一とすることができる。また、圧力を解除して両フィルム基板間の間隔を所期の間隔に復帰させることにより、シール材の内側における両フィルム基板間が負圧となり、これにより封止材を液晶注入口の内側に引

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き込むようにしているので、封止材の液晶注入口内への入り込み量が大きくなり、その後封止材を硬化させて液晶注入口を封止しているので、液晶注入口から液晶が漏れにくいようにすることができる。

【図面の簡単な説明】

【図１】この発明の一実施例における液晶表示装置の製造に際し、（Ａ）は２枚のフィルム基板をシール材を介して貼り合わせた状態の断面図、（Ｂ）は挟持部材によって両フィルム基板の表裏両面側から圧力を加えた状態の断面図、（Ｃ）は完成した状態の断面図。

【図２】この発明の他の実施例における液晶表示装置の製造に際し、（Ａ）は挟持部材によって両フィルム基板の表裏両面側から圧力を加えた状態の断面図、（Ｂ）は

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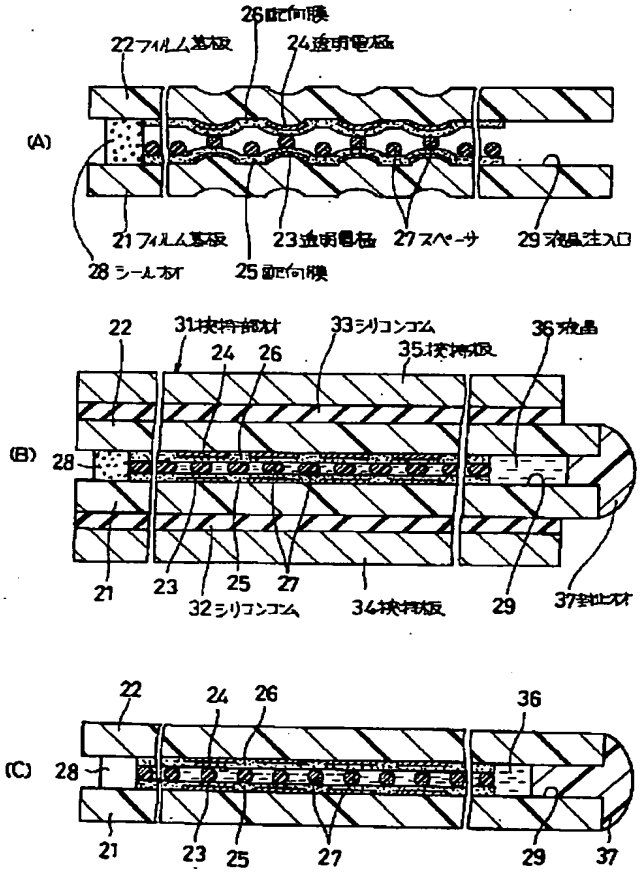
完成した状態の断面図。

【図３】従来の液晶表示装置の問題点を説明するために示す断面図。

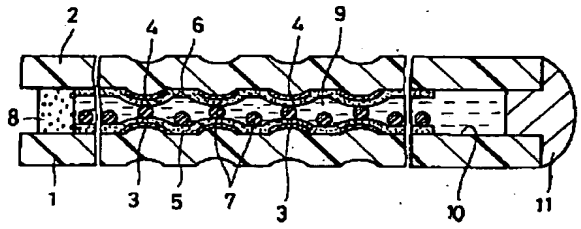
【符号の説明】

２１、２２　フィルム基板
２３、２４　透明電極
２５、２６　配向膜
２７　スペーサ
２８　シール材
２９　液晶注入口
３１　挟持部材
３６　液晶
３７　封止材

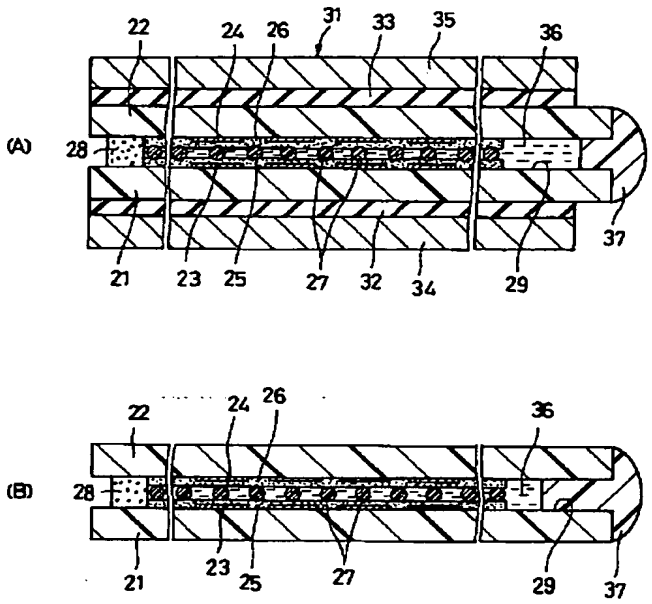
【図１】



【図３】



【図２】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